

UNIT 6

SUSTAINABLE NATURAL RESOURCE DEVELOPMENT AND CONSERVATION

THE RESOURCE SCARCITY DEBATE

- ◆ **Scarcities and limits:**
- ◆ Malthus thesis was one of the influential contributions to resource-scarcity.
- ◆ He asserted that human population will tend to outpace food production.
- ◆ As a result, the human population will suffer famine and distress.

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- ◆ Neo-Malthusians have revived and extended the view of Malthus recently to include the supply of other resource materials.
- ◆ Other theorists have interpreted scarcity to be as a result of unjust social and political systems rather than physical shortages and environmental problems.

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“Absolute” and “Relative” Resource Scarcities:

- ◆ **Absolute** scarcity exist when insufficient physical quantities of the resources are available to meet the demand for it.
- ◆ **Relative** scarcity on the other hand comes into play when the physical quantities of resources are sufficient to meet demand but problems arises over quantities of supplies.

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- ◆ The distinction between “**Absolute**” and “**Relative**” resource scarcities can also be viewed from Malthusian and Ricardian perspective of scarcity.
- ◆ Malthus considered that a fixed amount of land existed, and therefore definite environmental limits existed.
- ◆ David Ricardo, on the other hand, focused on the quality (rather than quantity) of land.

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- ◆ **Rees' Perspective of Resource Scarcity:**
- ◆ Rees classified resource scarcity into three:
 - **Physical scarcity**
 - **Economic scarcity**
 - **Geopolitical scarcity**
 - **Other forms of scarcity**
- ◆ The fourth category was labeled 'renewable and environmental resources scarcity'

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- ◆ **Physical scarcity:**
- ◆ Environmental materials such as land and water are limited in quantity; the earth is finite and limited in content.
- ◆ Physical scarcity depends on the quantity of the materials that exists within the earth and on the level of consumption or demand.

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- ◆ **Economic scarcity:**
- ◆ Considers the market as an important factor in relation to demand, supply and scarcity.
- ◆ Fall in price of a resource may boost demand but reduce the supply for such resource.
- ◆ Scarcity is based on the idea that when limited supply of goods or services comes up against an ever increasing demand for it.

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- ◆ **Geopolitical Scarcity:**
- ◆ This is related to spatial patterns and control of the resource by restricting output.
- ◆ For example Arab Oil Producers cut production and placed embargoes on sales to the United States and some other Western Countries.
- ◆ Panic Buying allow OPEC to double the price of crude oil.

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- ◆ **Other forms of scarcity:**
- ◆ Renewable and environmental scarcity encompasses scarce qualities other than physical quantities of the resource.
- ◆ These qualities may be aesthetic, as in the case of attractive landscape or may be physical.
- ◆ Scarcity of this nature may increase through time, as the side effects of the exploitative use of environmental resources take their toll

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- ◆ **The significance of resource scarcities:**
- ◆ Much improved transport and better distribution system
- ◆ Technical improvements in agriculture and more intensive use of land.
- ◆ Better conservation of resources because scarcity leads to changes in resource management.

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- ◆ However, the idea that destruction leads to conservation ignores the possibility that resources may be completely exhausted, so that improvement to the resource becomes impossible.

BIOLOGICAL DIVERSITY

- ◆ **Definition of Biodiversity:**
- ◆ 1992, UN Earth Summit in Rio de Janeiro defined biodiversity as “the variability among living organisms from all sources, including, among other things, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and ecosystems”

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- ◆ **Origin of life and Biodiversity:**
- ◆ Biodiversity found on earth is as a result of 3.5 billion years of evolution.
- ◆ Since the advent of humans, however, biodiversity has begun a rapid decline, with one species after another suffering extinction.
- ◆ Most of the diversity is found in tropical forests.

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- ◆ **Biodiversity in Africa:**
- ◆ Africa has a large and diverse heritage of flora and fauna, including major domesticated agricultural crops such as sorghum.
- ◆ In some countries, areas that were particularly rich in biodiversity were often designated as sacred groves and protected areas.
- ◆ First National parks that were created includes Kruger National Park in South Africa (1928)

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- ◆ And Toubkal National Reserve in Morocco (1944).
- ◆ Eastern Africa has the highest number of endemic species of mammals
- ◆ Madagascar is the most endemic rich country in Africa, and sixth in the world for higher vertebrates and third rich most plant-rich country after DRC and Tanzania.

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- ◆ **Ecological role of Biodiversity:**
- ◆ All species provide some function to an ecosystem;
 - They can capture and store energy
 - Produce organic materials
 - Decompose organic materials
 - Control erosion or pests
 - Fix atmospheric gases

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- ◆ Ecosystems also provide purification of the air and water;
- ◆ Stabilization and moderation of climate;
- ◆ Decrease of flooding, drought and other environmental disasters to support production.

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- ◆ **Economic role of Biodiversity:**
- ◆ It is a source of resources for daily life in the form of:
 - ➔ Food
 - ➔ Medication
 - ➔ Industry
 - ➔ Tourism and recreation

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- ◆ **Biodiversity: time and space:**
- ◆ Biodiversity is not a static phenomenon, it's a system in constant evolution.
- ◆ Biodiversity is not distributed evenly on earth.
- ◆ It is consistently richer in the tropics
- ◆ Flora and fauna vary depending on climate, altitude, soils and the presence of other species.

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- ◆ **Hotspots of biodiversity:**
- ◆ Biodiversity Hotspots is a region with many endemic species.
- ◆ Hotspots tend to occur in areas of historically limited human impact and are generally very productive.
- ◆ Increase in human population is mounting pressure in these areas as a result of human activities.

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- ◆ **Threats to biodiversity:**
- ◆ Over the last decades, erosion of biodiversity has been on the ascendancy.
- ◆ All agree that, these losses are due to human activities; in particular, destruction of plants and animal habitat and consumption of organic resources

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- ◆ **Some of these threats can be attributed to:**
- ◆ Over-harvesting or illegal taking of species
- ◆ Habitat loss or fragmentation
- ◆ The introduction of exotic species
- ◆ Pollution and land degradation
- ◆ Climate change and land disasters.

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- ◆ **Biodiversity Management:**
- ◆ The sustainable use of ecosystems, species and genetic material.
- ◆ Developing national strategies and action plans
- ◆ Integration of biodiversity considerations into national development strategies.
- ◆ Use traditional methods and knowledge
- ◆ Foster the sharing and sustainable use of biotechnology

SUSTAINABLE RESOURCE DEV'T

- ◆ **Carrying capacity concept:**
- ◆ Human life depends on healthy ecosystems which supply life-sustaining resources and absorb waste.
- ◆ However, the rate of consumption levels and population growth is putting much pressure on the ecosystem.
- ◆ This implies that, there are thresholds at which the level of stress leads to the disruption of the ecosystem

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- ◆ One concept that explains this phenomenon is the “**carrying capacity concept**”.
- ◆ This concept assumes that there are finite number of people, who can be supported without degrading the natural environment and social, economic and cultural systems.
- ◆ The concept measures the maximum number of stress that the ecosystem can maintain.

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- ◆ **Resource use and the concept of sustainable development:**
- ◆ Sustainable development has been defined as “development that meets or satisfies the need of the present generation without compromising the needs of future generations to meet their own needs”.
- ◆ It opposes policies and practices that support economic growth by depleting natural resources.

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- ◆ **Characteristics of the concept of sustainable development:**
- ◆ Sustainable dev't respects and enhances the capacity of local communities to maintain and develop sustainable livelihood without destroying the economic and social resource base.
- ◆ Sustainable dev't is oriented to achieving explicit ecological, social and economic objectives

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- ◆ It may impose ecological limits on material consumption while fostering qualitative development at the community and individual levels.
- ◆ It also requires government intervention but also leadership and corporation from the private sector.
- ◆ It demand policy integration and coordination of all spatial skills

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- ◆ **Principles of sustainable development:**
- ◆ Peoples participation in development
- ◆ Local self-reliance
- ◆ Regional locus of control
- ◆ Social entrepreneurship
- ◆ The use of appropriate technologies
- ◆ Long-term horizon
- ◆ Supportive network

CONSERVATION OF NATURAL RESOURCES

- ◆ **Brief history of conservation:**
- ◆ Conservation is as old as mankind and has acquired many definitions.
- ◆ To some conservation meant protection of wild nature and to others it's the sustained production of useful materials from the living resources of the earth. E.g forestry, fisheries.

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- ◆ The conservation movement opposes the view that resources should be used up in the short run for immediate benefit of the present generation without responsibility toward the future generation.
- ◆ Conservation derived its knowledge from **Ecology**: the science that concerns with the relationship b/n living things and their environment.

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- ◆ Two major concerns for conservationists are *the loss of tropical rain forest* and *the outbreak of coral bleaching*.
- ◆ Tropical rainforest are the major source of world's biodiversity.
- ◆ **Coral bleaching** is a stress condition in reef corals that involves a breakdown of the symbiotic relationship between corals and unicellular algae.

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- ◆ **Goals of conservation:**
- ◆ Natural resources are definitely for man's use, so they must be developed and used for our benefit, but not to be locked up or preserved.
- ◆ It stands for the prevention of waste in the exploitation, processing and utilization of natural resources
- ◆ Natural resources need to be developed and preserved for the benefit of all and not few.

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- ◆ **Principles of conservation:**
- ◆ Ensuring the beneficial use of resources
- ◆ Variability of use
- ◆ Substitution
- ◆ Harmonious property relation
- ◆ Allocation of resources
- ◆ Recycling
- ◆ Forecasting and planning

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- ◆ Spiritual and aesthetic use of resources
- ◆ Individual responsibility for conservation

THE IMPACT OF POPULATION GROWTH ON FOOD SUPPLIES AND THE ENVIRONMENT

- ◆ **Widespread Malnutrition:**
- ◆ As population grows pressure on arable lands water and biological resources also increases.
- ◆ Resources loss its nutrients that supports food production.
- ◆ This leads to fall in food production.

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- ◆ **Inadequate water resource:**
- ◆ Competition for water resources among individuals, regions and nations increases as population grows.
- ◆ About 40 percent of the world's population lives in regions that directly compete for shared water resources.

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- ◆ **Energy:**
- ◆ Fossil fuel is the greatest source of energy for food production.
- ◆ Fossil fuel: Any carbon-containing fuel derived from the decomposed remains of pre-historic plants and animals, e.g. coal, peat, petroleum, and natural gas.
- ◆ Because fossil fuel is a finite resource, its depletion accelerates as population needs for food and services increases

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- ◆ **The way forward:**
- ◆ Improved technology will assist more effective management and use of resources.
- ◆ Though it cannot support sustained agricultural production and preservation of water bodies.
- ◆ Responsibilities of policy makers:
- ◆ Strategies must be based on conservation and careful management of land, water, energy and biological resources needed for food production

SOME OTHER GLOBAL RESOURCE ISSUES

- ◆ **The Earth Summit:**
- ◆ It is the name given to the United Nations Conference on Environment and Development
- ◆ (UNCED) held in Rio de Janeiro in June 1992.
- ◆ 178 governments were represented at the summit.
- ◆ The framework convention on climate change introduced measures designed to reduce the threat of global warming.

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- ◆ The Rio Declaration included 77 principles which it was believed should guide action on development and the environment.
- ◆ Finally, the forest principles emphasized the right of states to exploit their own forest resources while advocating a general principles of sustainable forest management.

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- ◆ **The UN Commission on Environment and Development:**
- ◆ It was an independent body established by the UN in 1983 to formulate “ a global agenda for climate change”.
- ◆ The commission membership comes from 22 nations and is chaired by Gro Harlem Brundtland.

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- ◆ Its purpose was to propose strategies for sustainable development by the year 2000, promote co-operation between nations at different stages of economic development, and to consider ways by which the international community can deal with environmental concerns

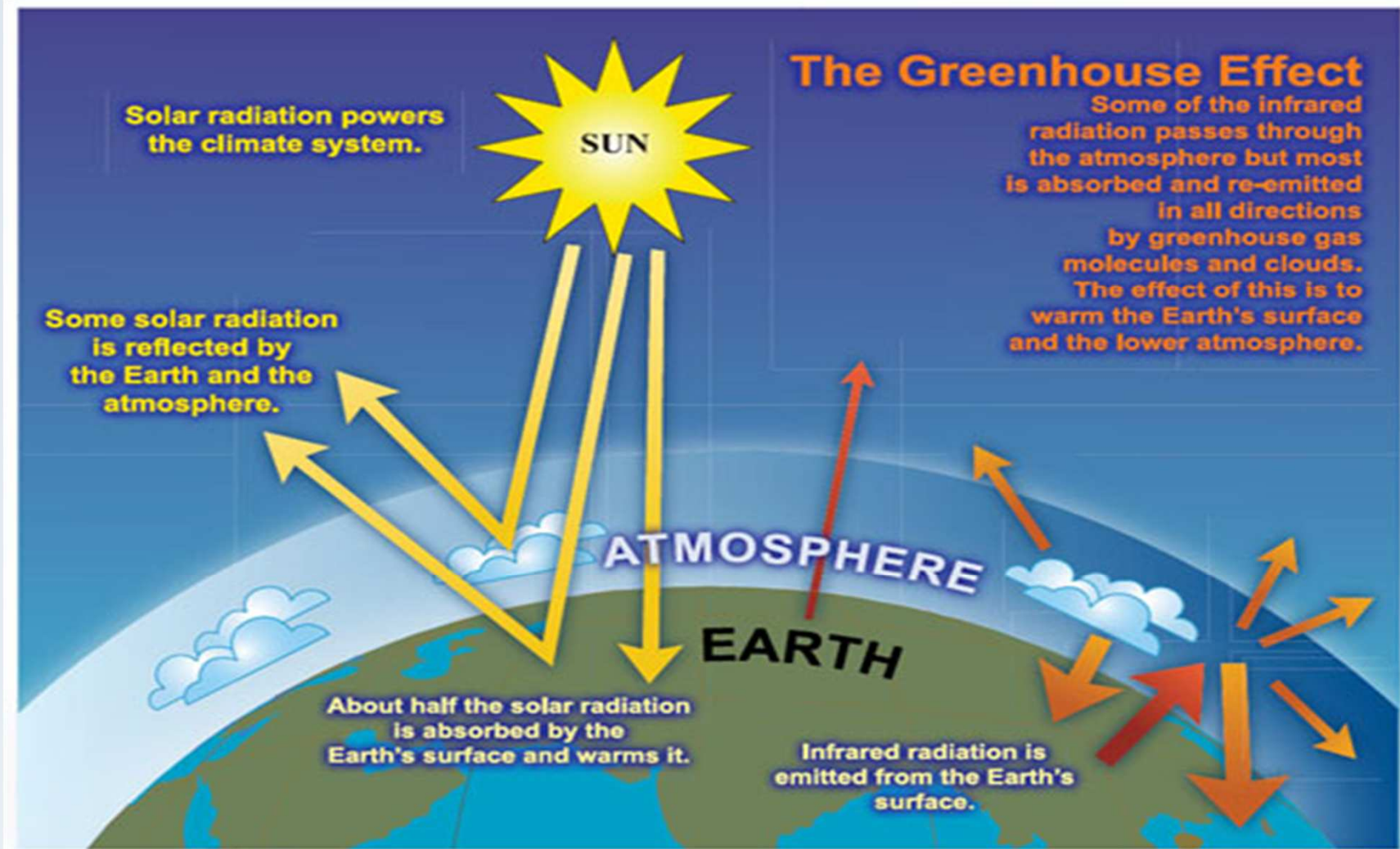
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- ◆ **Greenhouse effect and Global warming:**
- ◆ It is the planetary atmosphere-warming phenomenon, resulting from the absorption of infrared radiation by atmospheric constituents.
- ◆ The heat caused by infrared radiation is absorbed by "greenhouse gases" such as water vapor, carbon dioxide, ozone and methane, which slows its escape from the atmosphere

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- ◆ Without these gases, heat could escape back into space and Earth's average temperature would be about 60°F colder.
- ◆ The greenhouse effect is important.
- ◆ Without the greenhouse effect, the Earth would not be warm enough for humans to live.
- ◆ But if the greenhouse effect becomes stronger, as it has now become, leads to **global warming.**

Green house effect

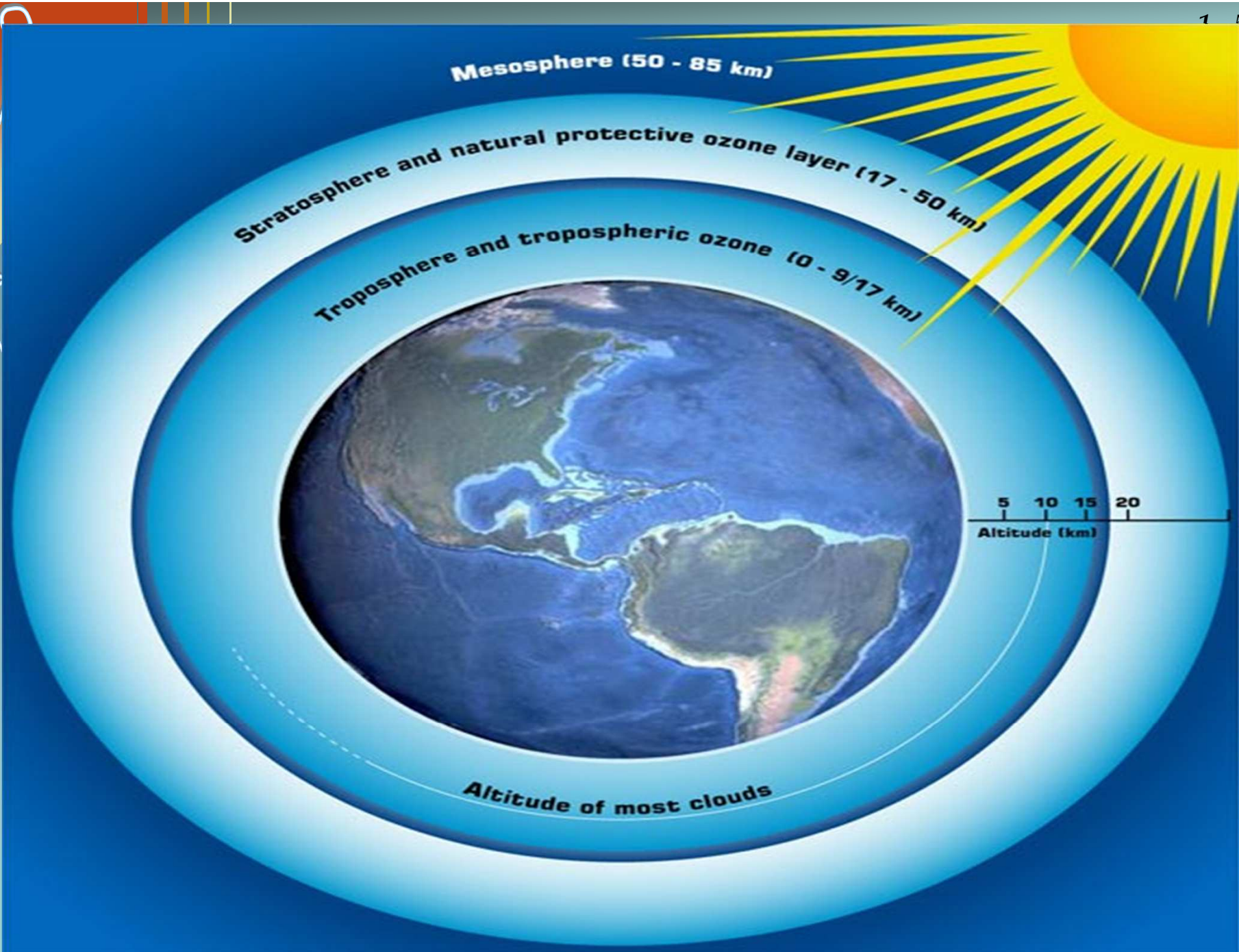


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- ◆ Some causes of this phenomenon have been identified as follows:
- ◆ Burning natural gas, coal and crude oil
- ◆ Many factories produce long-lasting industrial gases
- ◆ Deforestation
- ◆ Population growth

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- ◆ **Ozone layer:**
- ◆ Ozone (O₃) is a gas that occurs naturally in our atmosphere.
- ◆ It is produced by the action of ultraviolet light from the sun on oxygen (O₂) in the air.
- ◆ Most of it is concentrated in the **ozone layer**, a region located in the stratosphere several miles above the surface of the Earth.



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- ◆ The ozone layer shields the earth from the harmful effects of the solar ultraviolet radiation, but can be decomposed by complex chemical reactions, notably involving chlorofluorocarbon.
- ◆ This substance is used as a pressurized propellant in refrigerating systems etc.

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